

Remarks/Arguments:

Claims 1, 2 and 5-9 and 21-33 are pending in this application. Claims 3, 4 and 10-20 are cancelled without prejudice or disclaimer of the subject matter thereof. Claim 1 has been amended, and claims 21-33 have been added.

Rejection of Claims 1, 2 and 6 Under § 102(b)

It is respectfully pointed out that claim 1 has been amended to more clearly define the present invention, namely that the fluid treatment system includes the combination of a UV energy transmissive barrier, a fluid passageway at least partially defined by an interior surface of the UV energy transmissive barrier, at least one UV energy source positioned proximal an exterior surface of the UV energy transmissive barrier to transmit UV energy through the barrier and into the fluid passageway, and at least one UV energy sensor positioned proximal the exterior surface of the UV energy transmissive barrier to sense UV energy transmitted through the barrier by the source, wherein the sensor is configured to detect a reduced amount of UV energy transmitted through the barrier.. This amendment is made in accordance with MPEP §608.04, as no new matter has been added by this amendment.

Claims 1, 2 and 6 have been rejected under § 102(b) as being anticipated in view of Ross. With respect to claim 1, the Office Action suggests that Ross discloses a fluid passageway at least partially defined by a UV energy transmissive barrier, a UV energy source positioned to transmit UV energy through the barrier into the passageway, and a UV energy sensor positioned to sense UV energy transmitted through the barrier, the sensor being configured to detect a reduced amount of UV energy transmitted through the barrier. Further, it is suggested that Ross discloses the fluid passageway as being configured to accommodate fluid flow. With respect to claim 2, the Office Action suggests that Ross discloses the fluid passageway as being configured to accommodate fluid flow. With respect to claim 6, the Office Action suggests that Ross discloses the UV energy source as being positioned adjacent the barrier.

Under 35 U.S.C. §102(b), a person shall be entitled to a patent unless the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States. Applicant respectfully submits that the invention comprises a unique combination of elements that is not disclosed by Ross.

Ross discloses water flow through an annular passageway surrounding a UV generator protected by a quartz cylinder (column 1, lines: 34-36). Further, Ross teaches a UV sensor that shuts off water flow in the event that the UV radiation level drops below a certain level (column

1, lines: 39-41). However, Ross does not disclose or suggest the following features recited in claim 1, as amended:

- (a) a fluid passageway at least partially defined by an interior surface of a UV energy transmissive barrier;
- (b) at least one UV energy source positioned proximal an exterior surface of the UV energy transmissive barrier; and
- (c) at least one UV energy sensor positioned proximal the exterior surface of the UV energy transmissive barrier.

Because Ross does not disclose or suggest these limitations of claim 1, claim 1 is not subject to rejection under 35 U.S.C. §102(b) in view of Ross.

Claims 2 and 6 depend from claim 1. Accordingly, claims 2 and 6 should not be subject to rejection under 35 U.S.C. §102(b) in view of Ross for the same reasons.

Rejection of Claim 5 Under § 103(a)

Claim 5 has been rejected under § 103(a) as being unpatentable over Ross in view of Maiden. The Office Action acknowledges that Ross does not disclose the UV energy source as including an LED, but concludes that it would have been obvious to have modified the UV energy source disclosed in Ross so as to have included an LED as suggested by Maiden in order to provide a UV energy source having low power requirements. Applicant respectfully disagrees.

To establish a prima facie case of obviousness under 35 U.S.C. §103(a) three basic criteria must be met. MPEP §2143. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art must teach or suggest all of the claim limitations.

The cited combination of prior art references fails to meet all of these criteria with respect to the claimed invention as there is no inherent motivation to combine all of the reference teachings.

Ross teaches a purification device that functions by causing water to flow through an annular passageway surrounding a UV generator protected by a quartz cylinder (column 1: lines 33-36). This device is designed to be installed in-line with a water supply line (column 3: line 27). Water enters the device via an inlet port and through an inlet metering annulus designed

to limit the flow rate to remain within the treatment capacity of the unit. The fluid passageway is the area formed between the tubular member and quartz cylinder (column 3: lines 27-31). The flow path of the fluid through the passageway is limited by constrictions (column 1: lines 42-43). As water flows through the passageway, the UV tubes emit radiation(column 3: lines 33,34). A flow-sensor switches to the "ON" state whenever water is flowing through the unit, and remains in the "OFF" state when no flow occurs (column 3: lines 3-6). This switch is connected to a control circuit which increases the output of the UV generators when flow occurs, thus providing intense radiation which effectively kills the microorganisms in the water (column 3: lines 6-10).

Maiden teaches a hand-held water purification system that disinfects relatively small quantities or batches of water, such as the water contained in a drinking glass. (column 4: lines). Maiden comments on prior water purification systems that each include a flow-through subsystem, which causes water to travel past an elongated UV light source that is suspended therein (column 1: lines 19-23). Such systems are used to purify water for use in, for example, hospitals and schools (column 1: lines 25-27). According to Maiden, these flow-through systems do not work well with small quantities of water with which the hand-held portable system is expected to be used, are not conveniently portable, and are not designed to conserve power (column 4: lines 56-60). Maiden instead discloses a portable purification device that may be used by campers, hikers, and travelers instead of transporting bottled water or alternate portable filtering systems that are too inconvenient to carry (column 1: lines 45-53). The entire water purifier of Maiden is approximately six and three-quarters inches long and five-eighths of an inch in diameter and fits comfortably in one hand (column 4: lines 25-27). The system includes a pen-light sized configuration of one or more UV LED's, powered by a battery (column 2: lines 48-52). The first end of the system is immersed in water and the LED's turned on to purify the water (column 2: lines 53,54). The user may use the end of the system to stir the water to ensure that all of the water comes sufficiently close to the source of the UV radiation (column 3: lines 64-66).

It is respectfully submitted that there is no motivation to combine the teachings of Ross and Maiden. Ross discloses an industrial filtration system that is designed to be installed in-line with the water system of a building. Further, the filtration technique involves exposing UV radiation to a steady-state fluid mass flow. In contrast, Maiden teaches a portable, pen-light sized, water filtration device which is designed solely to disinfect small quantities of water having no mass flow. Both the teaching and suggestion to make the claimed combination must be found in the prior art and not based on the applicant's disclosure. In re Vaeck, 947 F.2d

488, 20 USPQ2d 1438 (Fed. Cir. 1991). Accordingly, this combination of disparate cited prior art proposed in the Office Action does not render the instant claimed invention as prima facie obvious. It is only with the instant specification in hand that one of skill could arguably have a motivation to combine Ross and Maiden. For the reasons stated above, claim 5 is not subject to rejection under 35 U.S.C. §103(a).

Rejection of Claims 1, 2, and 6-9 Under § 103(a)

Claims 1, 2 and 6-9 have been rejected under § 103(a) as being unpatentable over Wedekamp in view of Siebel et al. With respect to claim 1, the Office Action suggests that Wedekamp discloses a fluid passageway defined by a UV transmissive barrier, a UV energy source positioned to transmit UV energy through the barrier into the passageway. The Office Action acknowledges that Wedekamp does not disclose a UV energy sensor positioned to sense UV energy transmitted through the barrier, the sensor being configured to detect a reduced amount of UV energy transmitted through the barrier, but concludes that Siebel et al. discloses the concept of providing a UV energy sensor to sense UV energy transmitted through a barrier, the sensors being configured to detect a reduced amount of UV energy transmitted through the barrier and that Siebel et al. teaches that such a means provides an indication as to when an associated conduit requires cleaning. The Office Action further concludes that it would have been obvious to one skilled in the art to have modified the apparatus disclosed by Wedekamp so as to have included the UV energy sensor as suggested by Siebel et al. in order to provide an indication as to when the conduit required cleaning. Applicant respectfully disagrees.

Wedekamp teaches an apparatus for irradiating media wherein high irradiation intensities are achieved at every point of the irradiation chamber formed by a tubular body (column 1: lines 15-18). The arrangement of flat radiators significantly increases the efficiency of energy transfer in the tubular body as compared to the use of round radiators according to a prior German patent (column 2: lines 5-8). Specially shaped reflectors are used in concert with flat UV radiators to direct 80-90% of the UV energy into the media (column 1: lines 31-33). This apparatus is an improvement over the maximum UV energy described by the German patent (column 3: lines 23-25). The embodiment is not limited to the sterilization of media but can be applied also for other purposes such as UV skin tanning systems.

Siebel et al. teach non-destructive methods for the early detection of organic materials deposited on the internal surface of a conduit through which fluid flows (column 1: lines 9-12). These methods are useful in the detection of the formation and the removal of undesirable deposits of organic, biological or biochemical materials on the internal surfaces of reactors,

pipelines, oil pipelines, power plant condensers and the like (column 1: lines 14-21). The invention of Siebel et al. arose from the desire to improve over existing methods for monitoring and controlling biofilm and organic matter before they bring about undesirable results in the systems where they are deposited (column 3: lines 16-22). The amount of light absorbed by a compound at a specific wavelength can be correlated with the mass of the compound in the light path. Accordingly, light absorption can be correlated with organic sediment or biofilm mass (column 3: lines 64-68). A light emitter is placed in an opening on the conduit wall pointing towards the inside of the conduit and is connected to a power supply. A light sensor is also placed in an opening on the opposite side of the conduit also pointing towards the conduit and is connected to a meter which reads the current generated in the sensor (column 4: lines 5-11). This data is analyzed using an analytical technique called UV spectroscopy, whereby qualitative and /or quantitative changes in chemical compounds contained with matrices of sediments, silt, inorganic precipitates, corrosion products and the like (column 3: lines 24-29). Examples of these compounds are organic and biochemical materials which are embedded in the deposits and/or attached to inorganic, biological or biochemical materials such as cells or proteins also embedded in the biofilms (column 3: lines 30-34). Detection of these compounds is a clear indication of the extent of the presence of such inorganic, biological or biochemical material in the deposits or biofilm.

It is respectfully submitted that there is no motivation to combine the teachings of Wedekamp and Siebel. Wedekamp offers no inherent suggestion that an apparatus is subject to buildup or requires any UV detection. Further, Wedekamp does not disclose any motivation to combine the apparatus with any measurement system. Siebel et al. do not provide any suggestion to combine a biomass detection system with any other applications. For the reasons stated above, claim 1 is not subject to rejection under 35 U.S.C. §103(a).

Claims 2 and 6-9 depend from claim 1. Accordingly, Claims 2 and 6-9 should not be subject to rejection under 35 U.S.C. §103(a).

Rejection of Claim 5 Under §103(a)

Claim 5 has been further rejected under § 103(a) as being unpatentable over Wedekamp in view of Siebel et al. as applied in claim 1, and in further view of Koji. The examiner acknowledges that Wedekamp and Siebel fail to disclose a specific UV energy source including an LED, but suggests that Koji discloses an analogous apparatus including a UV energy source including an LED, and suggests that such an energy source requires less space, has better efficiency, and a longer lifetime as compared to a UV lamp. Further, the examiner suggests

that it would have been obvious to have included a UV energy source including an LED in order to provide a UV energy source requiring less space, having better efficiency, and a longer lifetime than a conventional UV lamp.

It is respectfully submitted that there is no motivation to combine the reference teachings of Wedekamp and Siebel in light of Koji. To establish a *prima facie* case of obviousness under 35 U.S.C. §103(a) three basic criteria must be met. MPEP §2143. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify a reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art must teach or suggest all of the claim limitations.

The cited combination of prior art references fails to meet all of these criteria with respect to the claimed invention as there is no inherent motivation to combine all of the reference teachings. For the reasons listed above, there is no inherent suggestion or motivation to combine Wedekamp and Siebel. Therefore there is no reason to combine Wedekamp, Siebel and Koji. Accordingly, claim 5 should not be subject to rejection under 35 U.S.C. §103(a).

In view of the foregoing amendment and remarks, Applicant requests the reconsideration and withdraw the objections to claim 1, 2 and 6-9, and further requests a Notice of Allowance for claims 1, 2, 6-9 and 21-33.

Respectfully submitted,

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